

Sustainability Sub-Council, Fall 2024

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iSEE

Institute for Sustainability,
Energy, and Environment



Agenda for Today

- **Carbon Neutral Energy Planning**
 - Overview
 - Analysis
 - Challenges and Opportunities
 - Potential Funding
 - Discussion
- **Plastic Waste Reduction**
 - Updates
 - Discussion
- **Carbon Credit Sales**
 - Updates
 - Discussion



Carbon Neutral Energy Planning

Facilities & Services – Utilities & Energy Services

October 8, 2024

Overview



- Illinois has a commitment to be carbon neutral as soon as possible and no later than 2050.
- The Illinois Climate Action Plan (iCAP) is our strategic plan for becoming carbon neutral, which is to achieve net-zero greenhouse gas emissions/year, by the year 2050.
- The planning document identifies at a high level the potential paths forward towards meeting the campus carbon neutrality goals.
 - This IS NOT a recommendation on how to achieve carbon neutrality, but rather an overview of the viable options available at this time.
 - This plan does provide recommendations for how the campus should proceed forward in the next 3-5 years.
 - This plan does provide insight into the costs associated with achieving the campus carbon neutrality goals



Options Evaluated

- Energy Conservation (Retro-Commissioning, ReCommissioning, Energy Performance Contracting)
- Carbon Capture and Sequestration
- Nuclear
- Biomass
- Renewable Natural Gas
- Waste to Energy / Anaerobic digester
- Hydrogen
- Solar/Wind with Energy Storage
- Battery Storage
- Thermal Energy Storage
- Geothermal/Heat Recovery Chiller (HRC)

Option Analysis



Option Analysis - \$/CO2 Saved Comparison					
Option	Initial Cost	(tons) CO2 Reduction	% Reduction of Total	Initial Cost (\$/tonCO2 Saved)	Annual Operating Costs
Building Control Upgrades <i>(3 year plan)</i>	\$ 8,528,111	2,854	0.7%	\$ 2,988	Lower (lower energy use, lower energy bill)
Retro-Commissioning (RCx) <i>(annual number)</i>	\$ 2,000,000	1,852	0.5%	\$ 1,080	Lower (lower energy use, lower energy bill)
Re-Commissioning (ReCx) <i>(3 year plan)</i>	\$ 15,394,300	5,924	1.5%	\$ 2,599	Lower (lower energy use, lower energy bill)
EPC <i>(annual number)</i>	\$ 5,000,000	1,155	0.3%	\$ 4,329	Lower (lower energy use, lower energy bill)
Carbon Capture and Sequestration	\$ 111,000,000	39,600	10.1%	\$ 2,803	Higher (higher maint. costs and energy usage associated with CO2 capture equipment)
Nuclear	\$ 180,000,000	8,818	2.3%	\$ 20,413	Higher (similar maintenance costs, refueling costs significant)
Biomass	\$ 139,000,000	57,474	14.7%	\$ 2,418	Higher (increased material handling, maintenance, cleaning)
Syngas	\$ 127,000,000	71,803	18.4%	\$ 1,769	Higher (increased cost for fuel, increased cost for carbon neutral power from the grid)
Waste to Energy/Biodigester	\$ 20,000,000				
Solar with Battery Storage	\$ 165,500,000	51,710	13.2%	\$ 3,201	Higher (lower maintenance costs, battery replacement costs significant)
Solar with Thermal Storage (Heat)	\$ 133,000,000	17,636	4.5%	\$ 7,541	Lower (lower maintenance costs)
Wind	\$ 182,500,000	51,710	13.2%	\$ 3,529	Lower (lower maintenance costs)



Recommendations

Near Term Recommendations

- Increase investments in energy conservation efforts by providing additional funding for Retro-Commissioning, Re-Commissioning, and Energy Performance Contracting.
- Construct Solar Farm 3.0.
- Install a new combustion turbine that is hydrogen capable and configured to allow carbon capture and sequestration.
- Build a financial reserve that could finance a large carbon neutral energy production project in the next 10-15 years.
- Continue to develop and expand research collaborations related to carbon neutral energy generation technology, including micro nuclear reactors and carbon capture.

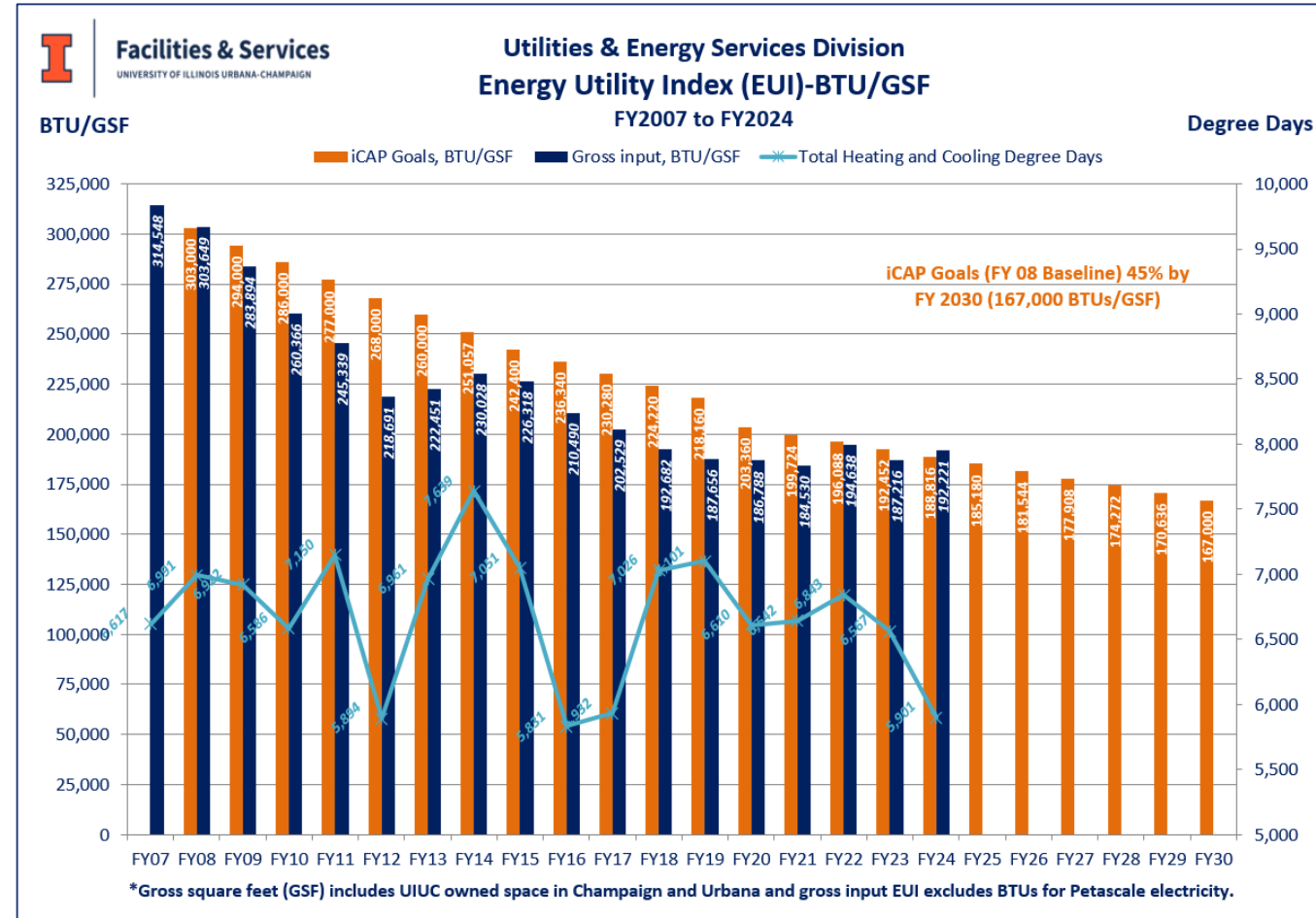
Longer Term Recommendations

- Commission an engineering evaluation of carbon neutral energy production options, with the goal of developing a formal plan and budget required to achieve the 2050 campus carbon neutral goals. This plan would focus on setting goals and budgets for 2036-2050.

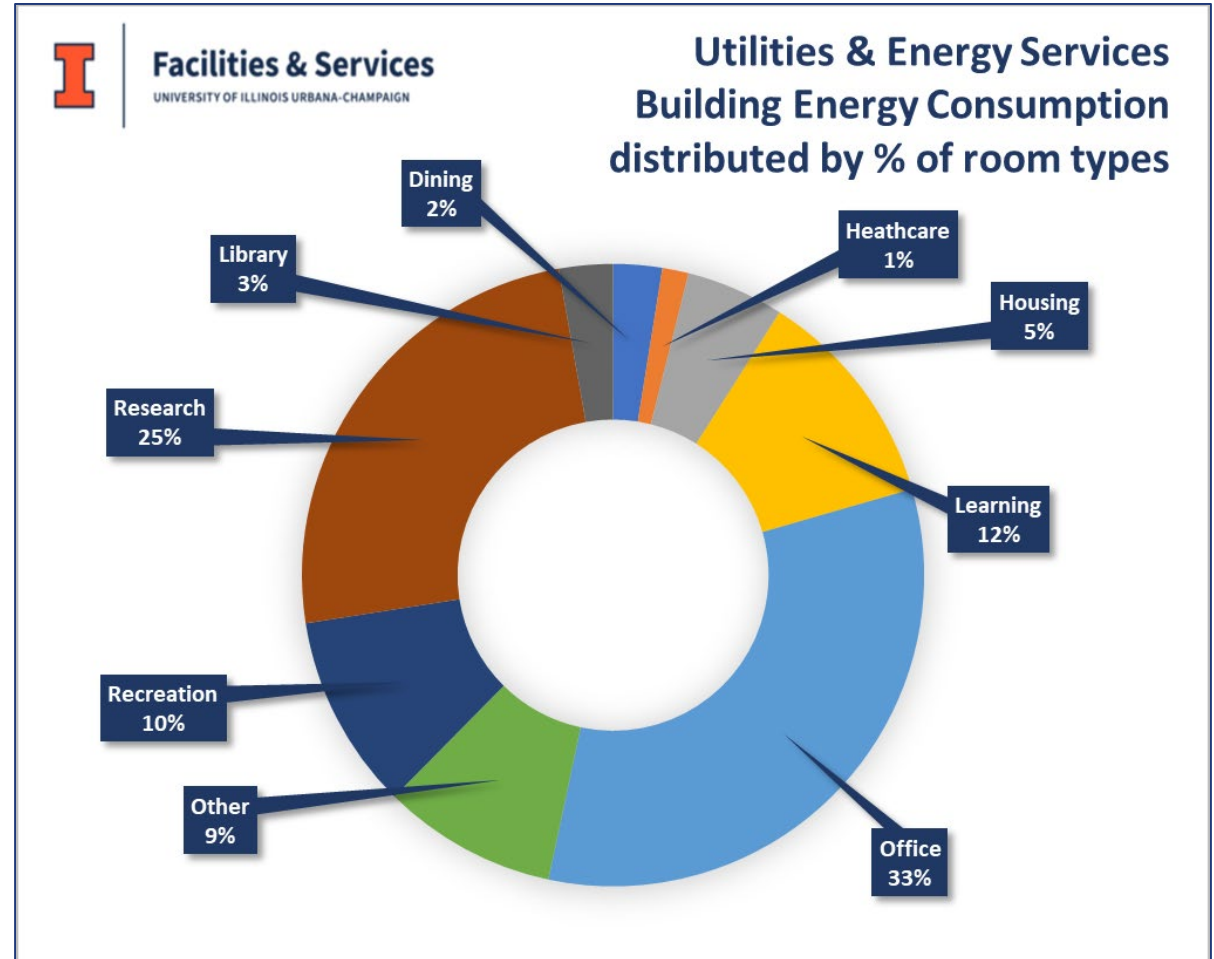
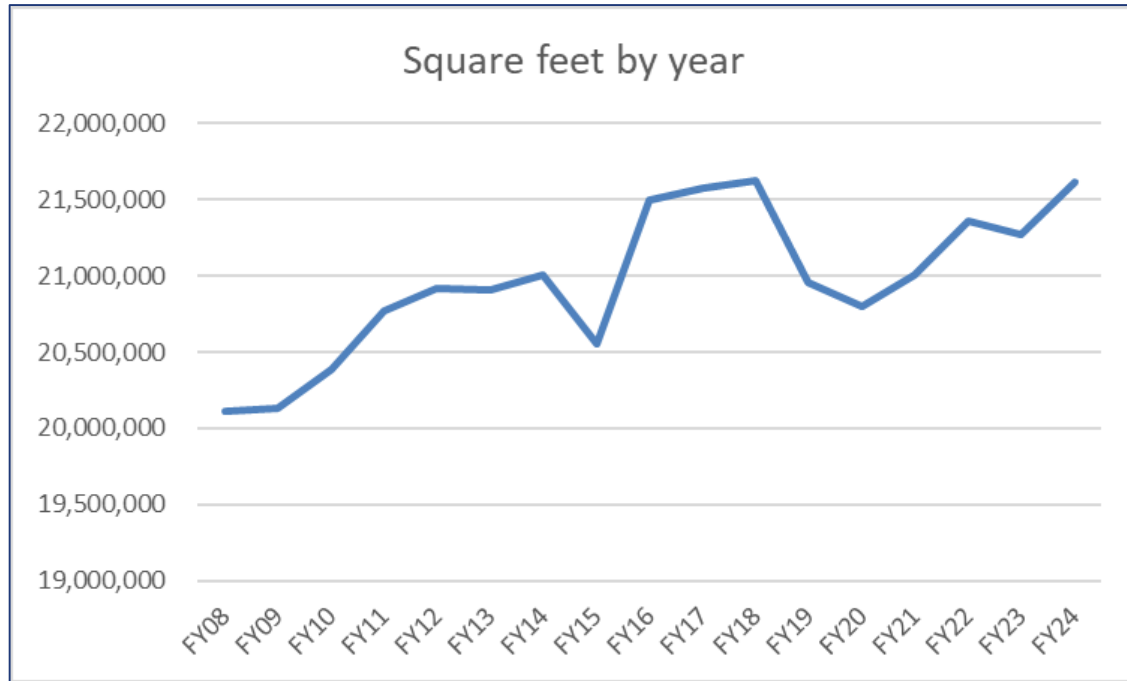


Challenges

- New buildings and campus growth (in terms of people, programs, and space)
 - EUI higher in FY24
 - back to the FY18 level
- Cutting sustainability aspects in favor of additional space, such as DKC
- Data centers, energy intensive research
 - i.e., MRIs now, AI soon
- Competing priorities
 - Difficult to earn IRA incentives without upfront funding allocations or financing approval(s)



Space Growth



Opportunities



- Incentives received from the Ameren Efficiency Program: \$1,652,335 since Jan. 2023
- Can we work with government affairs to lobby for policies that support our efforts with policy changes, especially related to nuclear permits?
- Can we commit that all new buildings on campus will be carbon-neutral?
- Financial opportunities
 - How can we get additional donor funds? Can we offer naming rights for cutting edge technology?
 - How can we identify sufficient funds to invest in these larger climate-friendly technologies? Perhaps creating a financial reserve that is built up during the next few years, or perhaps self-financing some projects.
 - How can we get stronger support from campus and university leaders, to avoid cutting sustainability features from large projects and to fund climate-friendly technology?
 - This would require Provost approval of the costs, and the budget impacts would need to be communicated with the Deans and Auxiliaries and Vice-Chancellors.



Potential funding programs

- Inflation Reduction Act (IRA)
 - Generally, tax credits range from 6% to 30%, and could be as high as 50% of the cost of the energy property.
 - Underground Thermal Battery Storage anticipates receiving ~\$50k
 - Wymer Hall geothermal anticipates receiving \$2.5M
 - Other IRA funding opportunities, such as the Title 17 Clean Energy Financing Program, which can finance projects in the United States that support clean energy deployment and energy infrastructure reinvestment to reduce greenhouse gas emissions and air pollution



Potential funding programs

- Commercial Property Assessed Clean Energy (C-PACE) Financing
 - Property owners can obtain up to 100% long-term, fixed-rate financing for energy efficiency, renewable energy, resiliency, water use and electric vehicle charging building improvements, through using a lien secured against the property
 - Non-profit owners can typically qualify if they are able to receive special assessments on their property tax bills
- Illinois Climate Pollution Reduction Grant
 - State awarded \$430M to implement emissions reduction measures including community geothermal, fleet electrification, community-based livestock-waste to energy conversion via biodigestion
 - Competitive grant program expected Q1 of 2026



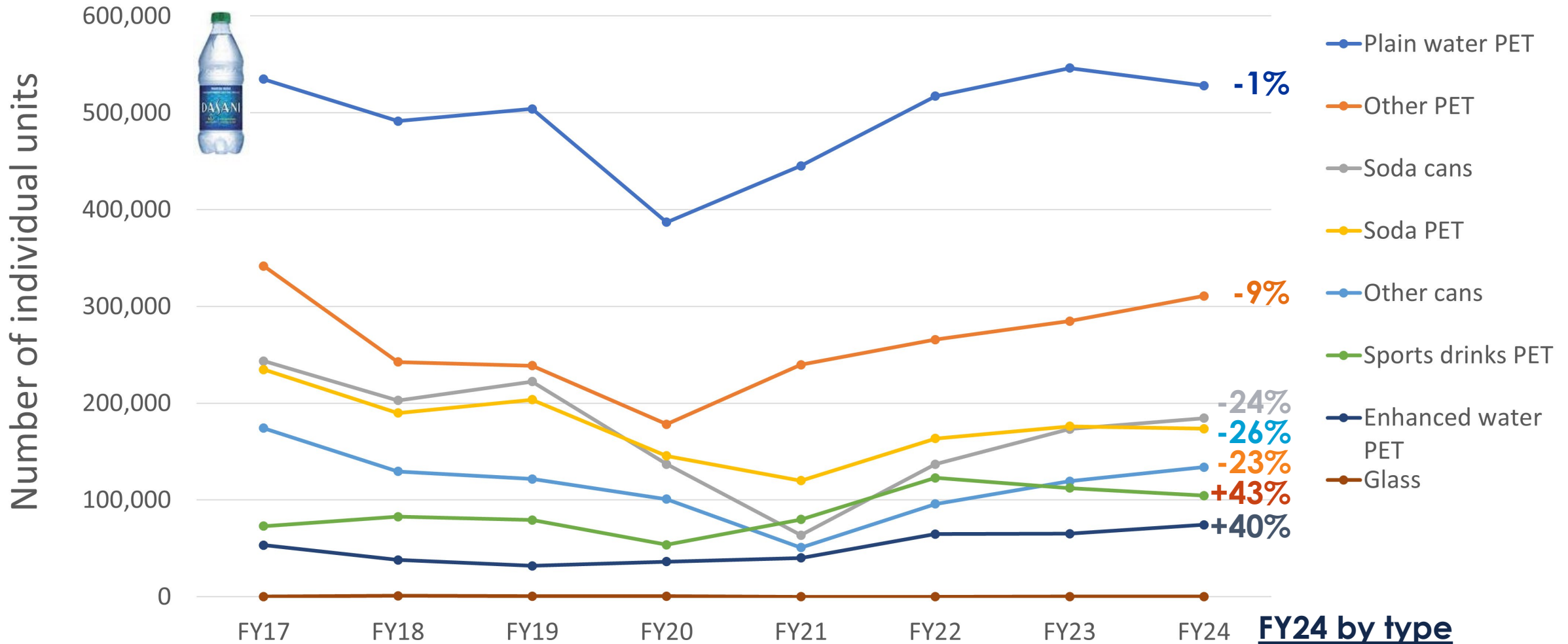
Potential funding programs

- Illinois Climate Bank
 - Over \$340M in federal awards distributed through multiple programs for grant funding and financing to public-private partnerships for energy, climate, and equity
 - § Private activity bonds finance capital projects - environmental projects are one category
 - § University of Chicago received \$30M in financing in 2024 for projects including clean energy projects
 - National Clean Investment Fund will provide \$100+M in financing for energy projects including Electric Vehicle Fleets and Associated Infrastructure, Carbon Free Schools, and Building Electrification
 - Revolving Loan Fund will provide \$14M in "bridge loans" for IRA-eligible projects to finance upfront costs



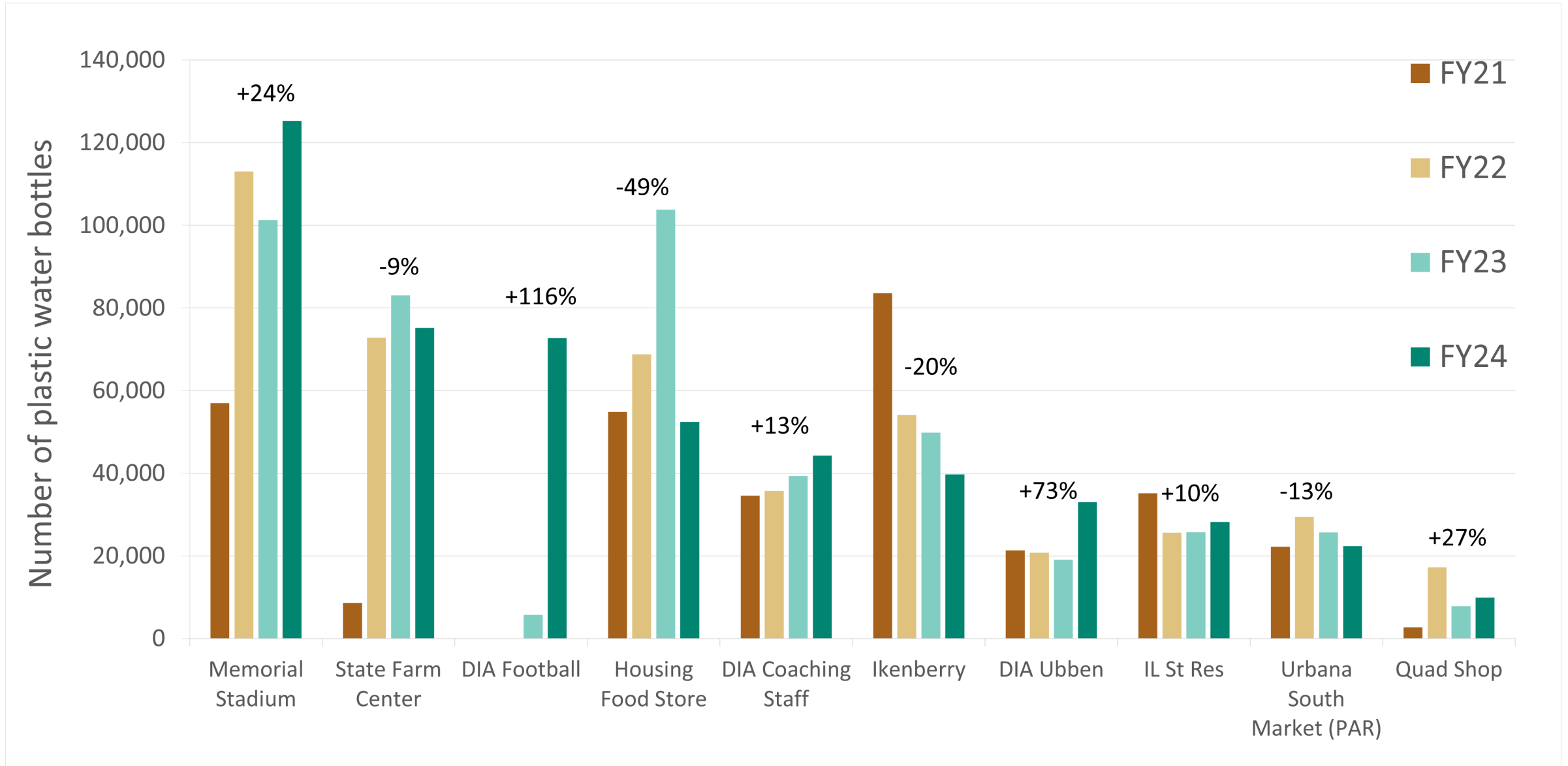
Single-Use Plastic Reduction Efforts

Continuing high demand for plastic bottled water



FY24 by type
 Bottles: 1,191,008 (79%)
 Cans: 318,396 (21%)
 Glass: 144

Bottled water patterns driven by athletics, catering, dining retail





Measures to reduce plastic waste - Athletics

- Increased recycling infrastructure and programming to raise awareness
 - Recycling bins at SFC, Memorial Stadium, Lot 31
 - ‘Toward Zero Waste’ events
- Improved policies and communication
 - Reusable bottles allowed at SFC, Memorial Stadium
 - Redesign of infographics, websites



ILLINOIS FOOTBALL CARRY-IN POLICY

ITEMS PERMITTED: Binoculars (without case), cameras (lenses no longer than 4”), blankets, jackets, items related to a medical condition, seat cushions (not more than 16” wide), diaper bags (with child), food items in clear bags, sealed plastic bottles of water 20 ounces and smaller, and empty water bottles/tumblers.

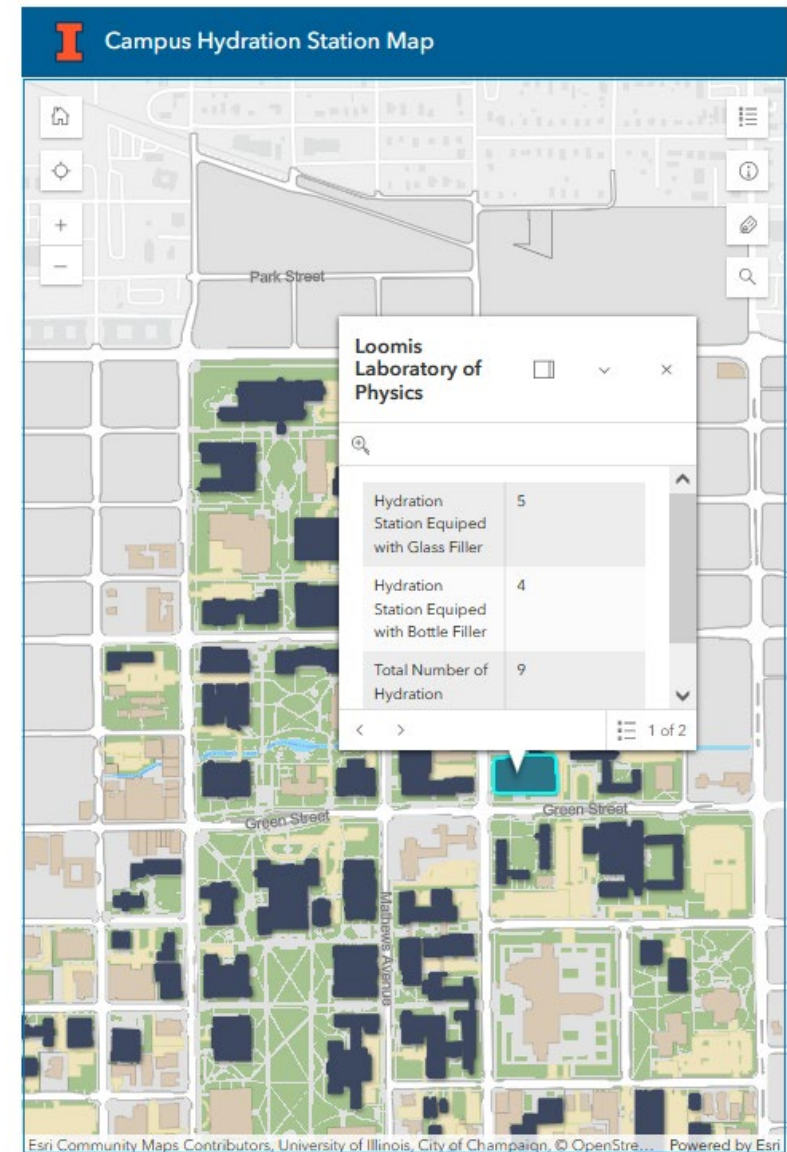




Measures to reduce plastic waste - Housing and Dining

- Increased access to bottle filler stations
 - SSC approved \$118K to purchase and install enhanced filler stations in residence halls
- Increased messaging about water access and quality
 - New map created by F&S
 - Water testing at residence halls
 - Campaign in development for Housing
- Improved policies at Housing Food Store
 - Provided reusable aluminum bottles to staff; prohibited plastic bottled water
 - Event planning team encouraging water in a beverage dispenser with compostable cups

Interactive Campus Hydration Station Map





Recent developments with Coca-Cola

- To reduce plastic bottled water at the Convocation lunch, access to municipal drinking water was provided and students were encouraged to bring reusable bottles
- Coca-Cola had staff at event handing out aluminum bottles of water.
- Coca-Cola ignored request from Illinois event staff to limit distribution to students without a reusable bottle.
- After the event, Coca-Cola suggested dispensing municipal water was a violation of our contract.





Discussion

Next steps with Coca-Cola

- Understand contractual obligations
 - If not a violation, offer access to municipal drinking water at more events
- Revisit discussion about supplying campus with water in aluminum cans
- Pilot a reusable cup program at athletic events



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Carbon Credit Sales



Updates

- In the internal MOU from July 2016, the university committed to replacing any carbon credits that were sold and used as offsets by the purchaser.
- The university has not replaced >250,000 carbon credits that were sold and used as offsets by the purchasers.
- These credits were *not* included in the university's emission reductions; we accurately reported that these carbon credits were 'sold.'
- We believe it is not necessary to replace these carbon credits and would like to update the MOU accordingly.





THANK YOU!



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